Preliminary Examination Report of AGRICULTURAL CONSERVATION PROBLEMS of POE VALLEY SOIL CONSERVATION DISTRICT

Oregon

July 1953

Prepared for
POE VALLEY SOIL CONSERVATION DISTRICT
by

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service — Pacific Region

Preliminary Examination Report

of

AGRICULTURAL CONSERVATION PROBLEMS

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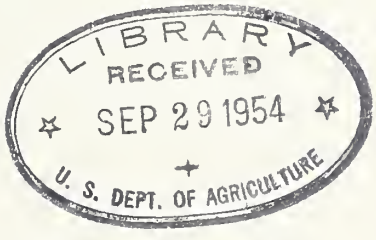
POE VALLEY

SOIL CONSERVATION DISTRICT

OREGON



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Soil Conservation Service - U. S. Department of Agriculture

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Poe Valley
Soil Conservation District
Oregon

SUMMARY

Presented herein are the findings of a preliminary examination of some of the agricultural conservation problems of Poe Valley Soil Conservation District, Klamath County, Oregon. The preliminary examination and this report were made at the request of the Directors of Poe Valley Soil Conservation District to assist them in preparing work plans for, and guiding the development of, the District.

The physical agricultural problems of the district include, but are not limited to:

Lack of development of irrigable lands.
Lack of drainage and reclamation of marshy areas.
Poor drainage of presently farmed land.
Inefficient irrigation methods and practices.
Lack of irrigation water storage facilities.
Flooding of agricultural and potential agricultural lands.
Alkaline and saline soils.
Unexplored and undeveloped ground-water resources.
Unimproved pastures and meadows.
Deteriorated native range lands.
Poorly reforested or non-reforested commercial forest lands.
Large expanses of low-producing pumice lands in lodgepole pine.

These physical problems are complicated by social and economic problems. Much of the potentially arable lands and forest and range lands are within the Klamath Indian Reservation. The land ownership pattern within the reservation is complex. The income of Indian owners from tribal funds is such that they have no pressing need to develop their lands. This retards development not only of their own lands but the privately owned blocks intermingled with the Indian lands where community type irrigation, drainage and/or flood control projects are prerequisite to land development. Outside the Indian reservation, some land owners apparently have outside incomes, hence have no great need to make their lands most productive, secure the greatest economic returns from such lands.

A more detailed summary and recommendations appear at the end of the following report. The report itself contains discussions of condition, problems, and possible solutions. A generalized map of the major problem areas of the district follows this page.

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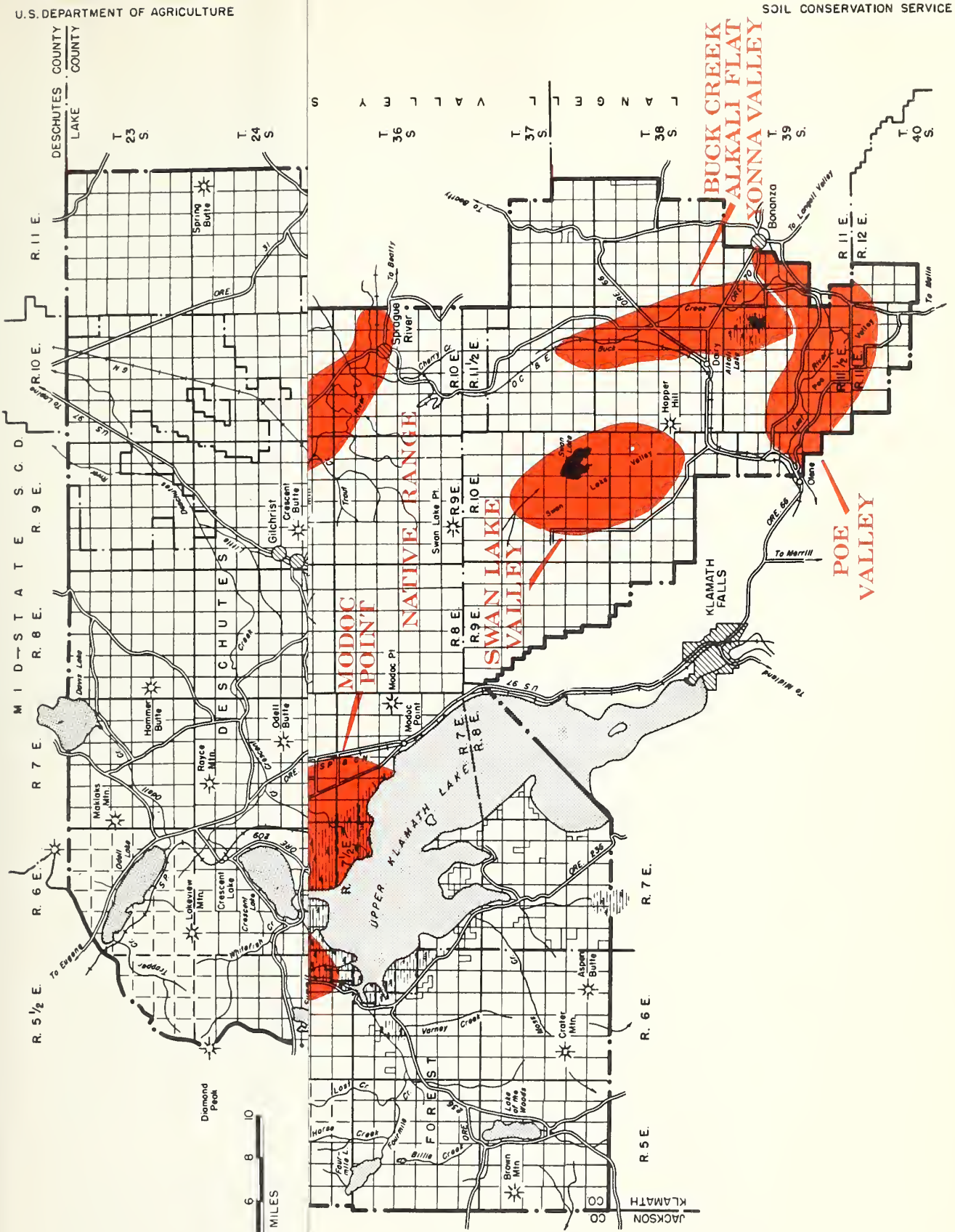

PROBLEM AREAS

LEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

MARCH, 1954

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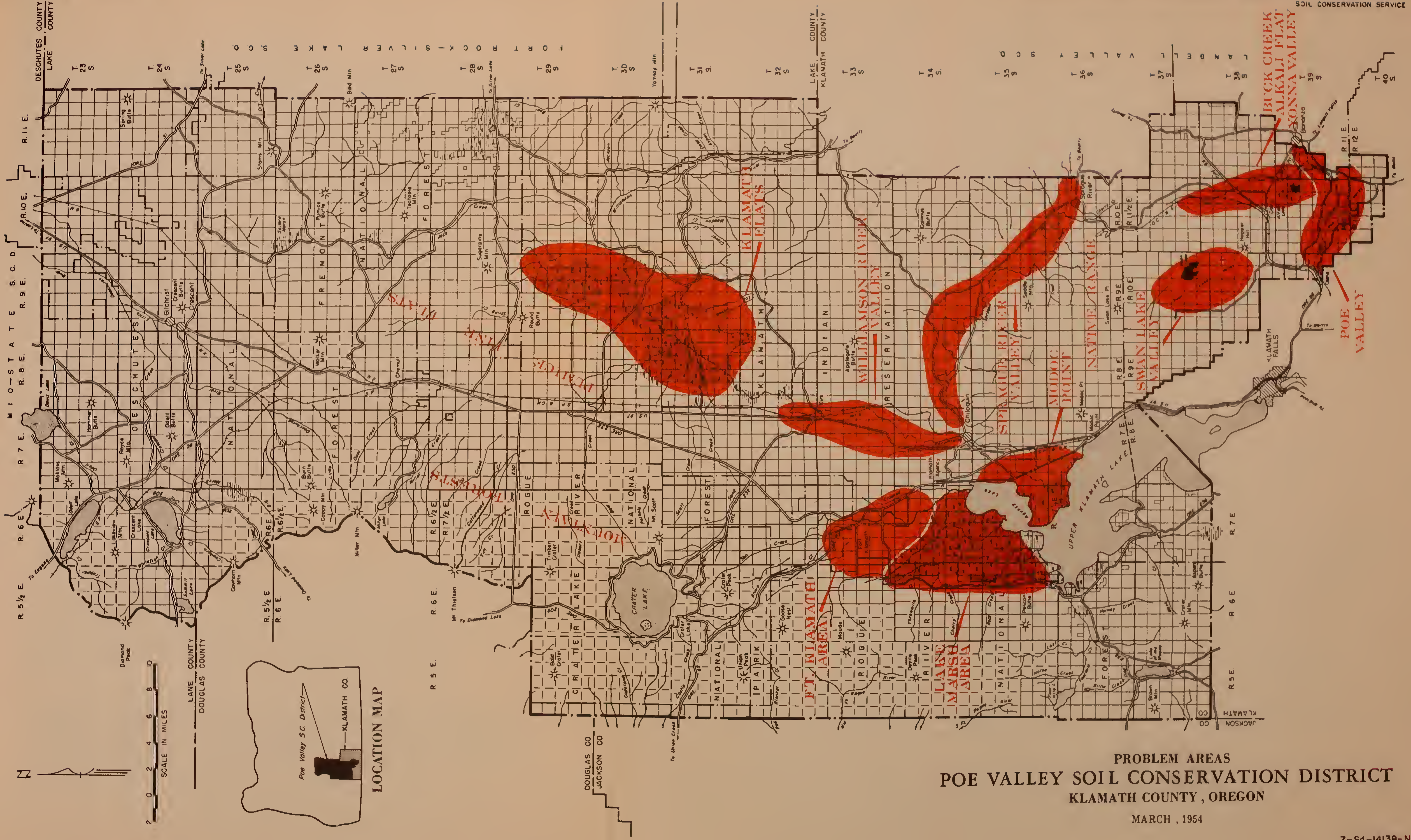

PROBLEM AREAS

POE VALLEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

MARCH, 1954

7-Sd-14138-N

INTRODUCTION

At the request of the directors, a preliminary examination of agricultural problems of Poe Valley Soil Conservation District was made in July 1953 to obtain information relative to land use, flood and other agricultural problems of the district. The examination was made cooperatively by the directors of the soil conservation district, Soil Conservation Service technicians stationed in the area and technical specialists of the Regional Office of Soil Conservation Service. Valuable information was obtained from, and hearty cooperation was extended by, representatives of several Federal agencies, such as the Bureau of Reclamation, Indian Service and Forest Service. The Klamath County Assessor also rendered valuable service in determining land ownerships.

Examinations consisted of observations of the area, studies of climate, streamflow, ground water and other data; discussions with technicians of several agencies; perusal of published and unpublished reports concerning the area, and studies of soils, vegetative cover, topography and other physical aspects of the district and environs. Land ownership patterns were also examined.

The primary purpose of this preliminary examination was to inventory, describe and locate the major agricultural problems pertaining to soils, vegetation, crops, and water supply of the Poe Valley Soil Conservation District. The purpose of this report is to present the findings of the survey in such a form and manner that it will serve as a long-range guide to the directors of the soil conservation district in formulating their work plans for the district, and permit them to so direct and concentrate their efforts on the most urgent problems that the greatest returns can be expected for the time and effort expended.

The resources available in time and personnel did not permit original investigations, research, detailed engineering surveys, or detailed agronomic and forestry studies.

DESCRIPTION OF THE DISTRICT

Poe Valley Soil Conservation District, as shown on the map following this page, includes and extends from Poe Valley on lower Lost River, in the vicinity of Olene and Bonanza southeast of Klamath Falls, north to the Deschutes County line, or roughly 100 miles. It extends from approximately the crest of the Cascades, on the west, eastward 30 to 40 miles. The district is approximately rectangular in shape, being 30 to 40 miles wide and about 100 miles long north to south. The district contains some 2,247,000 acres, or 3,520 square miles of land, marshes, stream beds, etc.

The soils, topography and vegetative cover of the district are extremely varied. Native vegetation varies from desert-like grass and sagebrush eastward from Klamath Falls to rain forests in the higher western mountain areas. Northward from the vicinity of Klamath Falls the cover changes from a grass-sagebrush-Juniper complex to climax stands of lodgepole and Ponderosa pine.

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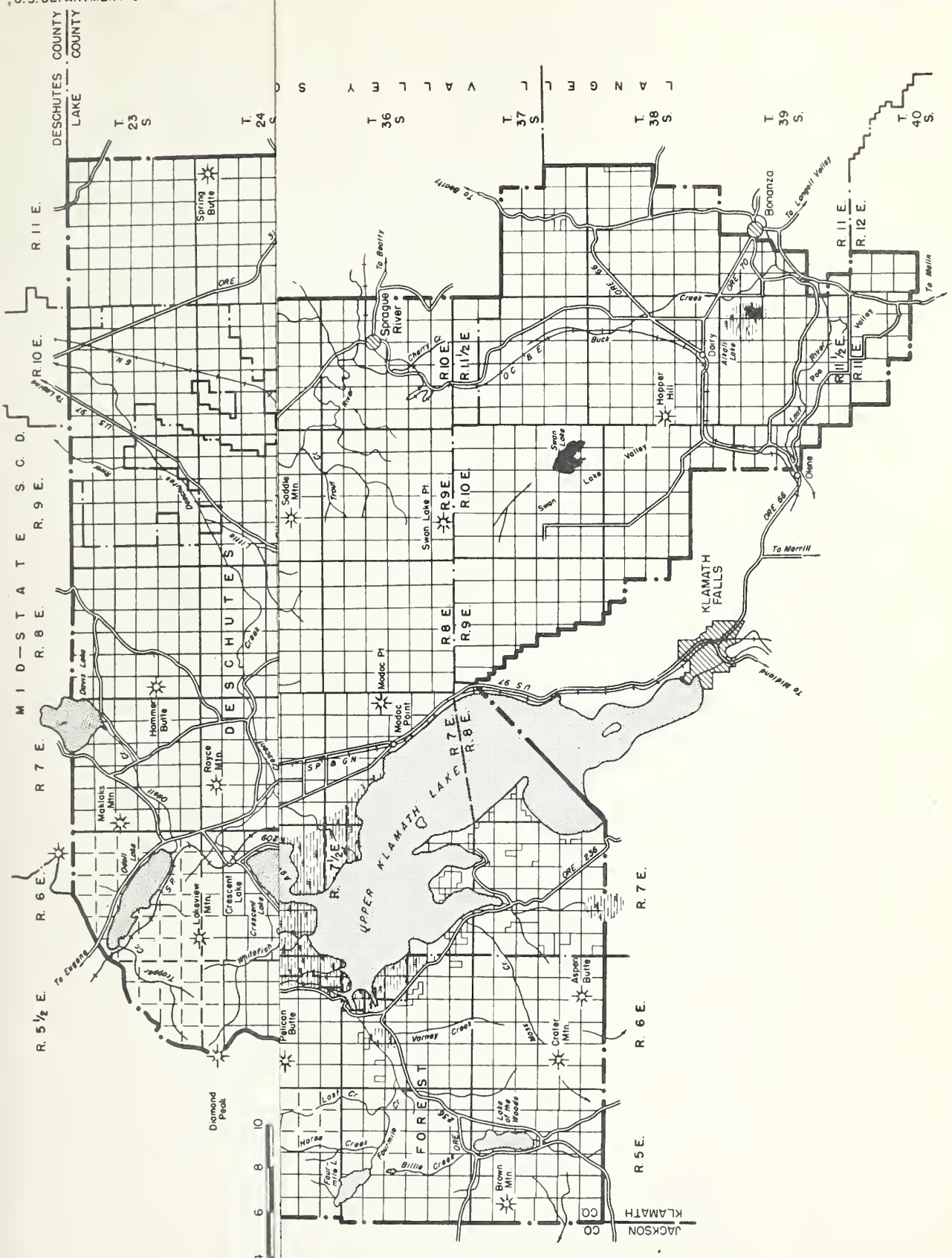

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KLAMATH COUNTY, OREGON

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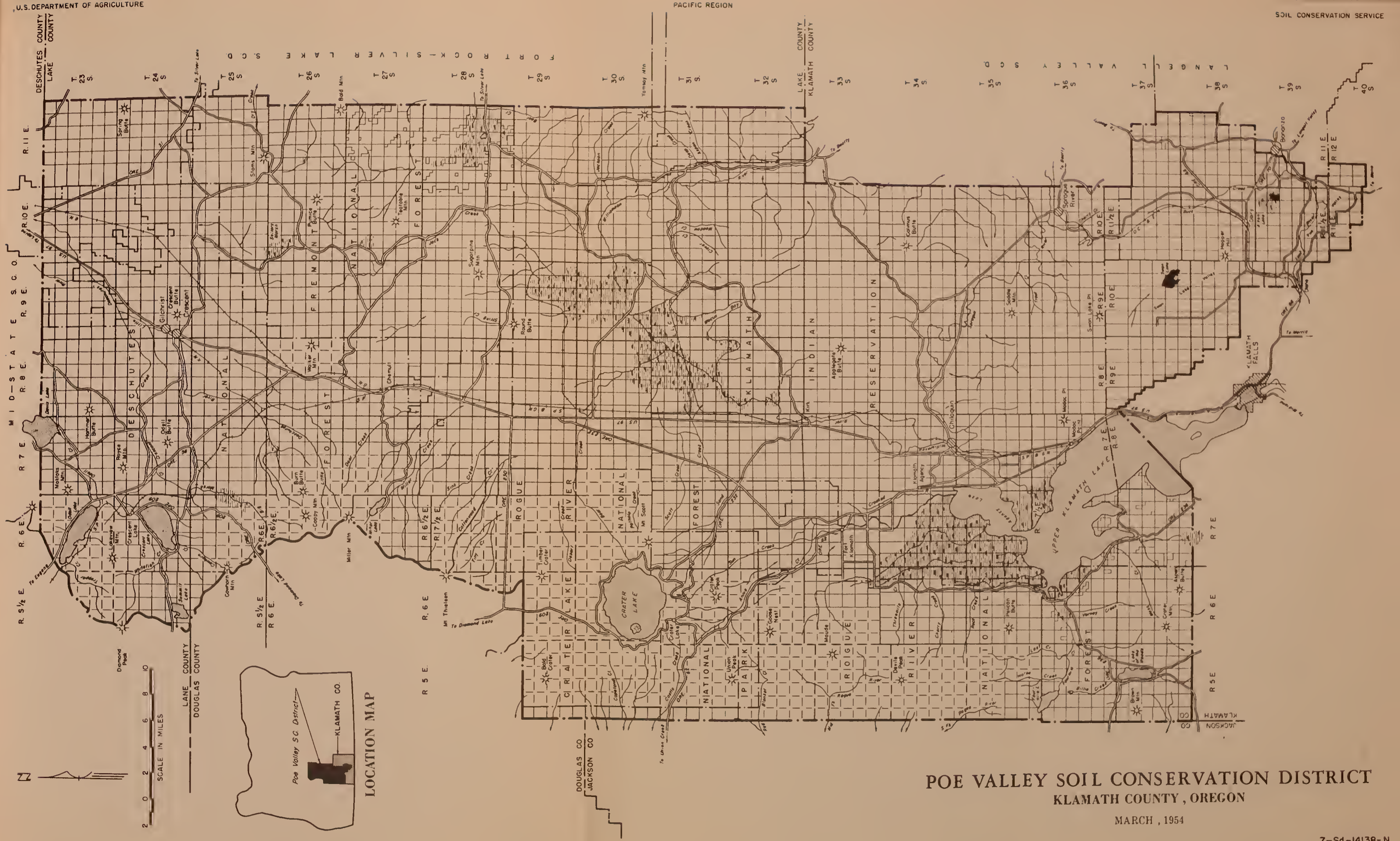

POE VALLEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

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Soils vary from mucks and peats in some of the river valleys and around some of the lakes through deep sedimentary valley soils to shallow and youthful volcanic soils. Very large expanses of youthful volcanic ash soils exist to the northeast, east and southeast of Crater Lake. Large areas of muck and peaty soils exist in the Klamath marsh and around Agency and the Klamath lakes. Rather large blocks of alluvial stream valley soils and sedimentary soils exist along Lost River, Swan Lake, in Yonna Valley, along the Sprague River and in the valley around Fort Klamath north of Agency and Upper Klamath lakes. The above-mentioned valleys and marsh areas are surrounded by much larger areas of rough broken mountainous land or, in the case of Klamath marsh, wide expanses of volcanic ash soils.

Percentagewise, the amount of arable land is relatively low as the volcanic soils are classed as non-arable.

Topographically, the district has four outstanding features. These are: (1) The mountain river valleys and old lake beds such as Lost and Sprague Rivers, Swan Lake and Yonna Valley. (2) The series of lakes around Klamath Falls and the old lake bed areas surrounding these lakes. (3) The rugged volcanic mountainous area along the western side of the district. (4) Most of the northern two-thirds of the district composed of a volcanic ash plain with relatively low relief and containing many marshy areas.

The land ownership pattern of the district is complex. Among Federal ownerships, parts of the Fremont, Deschutes and Rogue River National Forests are within the Soil Conservation District. Crater Lake National Park is also within the district. Some of the range land in the district is public domain or reverted land under the jurisdiction of the Bureau of Land Management. Fish and Wildlife Service controls some of the land around Klamath Lake. In addition to this Federal land, there are scattered parcels of state and county government lands within the district.

A large part of the Klamath Indian Reservation is within the district. This land is partially owned by the tribe in common. Other Indian lands are allotted to individuals and still other reservation lands have been deeded to Indians. A part of such patented land has been sold by the original patentees to non-Indians. Relatively small amounts of land within the reservation were patented by non-Indians before establishment of the reservation. Within the reservation, therefore, there is now a heterogeneous ownership pattern of non-Indians, individual Indians, land allotted to individuals but not yet patented and tribal lands. Patented and allotted land ownerships, in part, have been further complicated by subdivisions of original grants by heirs of deceased original owners. This land ownership pattern may, however, be subject to considerable change if present tendencies toward freeing Indians from Federal control develop and reach fruition.

Land outside the Indian Reservation and National Forests (Some within the outer boundaries of the National Forests) is privately owned

by non-residents, farmers, ranchers and lumber and pulp and paper companies. At least one corporation type farm has a large holding (on Modoc Point) in the district.

The ownership map following this page indicates the complex ownership pattern of the district.

The district contains some 2,247,000 acres of land. Of this total about 1,149,000 are forest; 899,000 are in range; about 132,000 are in hay and pasture; 57,000 in small grain and about 10,000 in row crops. From the above it can be seen that less than 10 percent of the district is what might be termed crop land. Over 90 percent of the area is in forest and range.

In so far as classification of land is concerned, there are approximately the following acreages in the several land capability classes, according to Klamath County Land and Water Inventory as prepared by Soil Conservation Service:

Land Class	Acres
I	10,000
II	54,000
III	47,200
IV	2,200
Vw	96,600
VI	1,047,000
VII	991,300
VIII	88,700
Total	2,247,000

It can be seen from the above that the amount of potential crop land is relatively small within this district. The total of Classes I through IV is some 113,400 acres. Except for Class V (marsh) land within the district, this 113,000 acres is practically the limit of crop land in the district. It will be noted there is over a million acres of Class VI land and nearly a million acres of Class VII. These acreages include the timbered slopes of the mountains in the west, the lodgepole pine flats of the north and the grass-sagebrush land of the southeastern parts of the district. The timber lands in the west and the range lands in the southeast, except for small valley areas, should without question remain in these uses. There is some possibility, however, of utilizing some of the pine flat lands in the northern part of the district for small grain, hay and pasture. This will be discussed later in this report. It is pointed out here as a possible source of additional arable lands for the district.

This district is rich in wildlife and recreational resources. The lakes and marshes are frequented by many kinds of water fowl, while the irrigated areas produce large numbers of pheasant. The forest, pine flats and sagebrush country have a rather high population of deer. The lakes and streams afford good fishing and many opportunities for picnicing, boating, swimming, etc. Crater Lake National Park is a nationally known scenic area. The district lies astride one of the main highways

between the Pacific northwest and the Pacific southwest. Catering to users of this highway is a business of no small magnitude. The main line of the Southern Pacific Railroad connecting the Pacific northwest with California also runs through this district. The district is served by fairly adequate networks of highways, farm to market roads, and logging roads. Electric power is available to nearly all of the populated areas, both rural and urban. Telegraphic, telephonic and radio communications are available within the area.

Klamath Falls, the principal city of the area, is the center of the lumbering industry and agricultural activities of the district. The third significant economic activity, after agriculture and lumbering, of Klamath Falls particularly, and of the area in general, is that of catering to the needs and wants of tourists and travelers.

The growth in population of this district has not kept pace with that of the Pacific northwest during the last few decades. No attempt was made to determine the population of the Soil Conservation District itself, but the following figures as reported by the Census Bureau, are indicative of the trend of the population in the area.

Year of Census	Population of Klamath Falls	Population of County (Klamath)
1920	4,801	11,413
1930	16,093	32,407
1940	16,497	40,497
1950	15,803	42,014

It will be noted that there was little change in the population of Klamath Falls from 1930 to the present, and also not much change in the county population since 1940. This is contrary to the general rise in state populations in the Pacific Northwest during the same periods.

CLIMATE AND WATER SUPPLIES

The climate of this area is complex due to location with reference to the Pacific Ocean and the Cascade Range, its topography, and other factors. Winters are moderately cold and relatively wet. Most of the annual precipitation falls during the winter months in the form of snow. Summers are warm and dry. This seasonal characteristic of the precipitation pattern is due to proximity of the North Pacific Ocean. Cyclonic disturbances originating off the Aleutian Islands in the late fall, winter and early spring move south and eastward across the coast and inland causing mild temperatures and relatively long and widespread storms. In the summer, the semipermanent high pressure area in the vicinity of the Hawaiian Islands moves north and shuts out the cyclonic air masses, causing dry weather. Excessively hot spells in summer and cold spells in winter are associated with southward outbreaks west of the continental divide of air masses from Canada. These earth wind movements are modified by the Cascade Range and other topographic features of the area. Most of the district is within the rain shadow of the Cascades.

Precipitation

Average annual precipitation varies from nearly 80 inches at the crest of the Cascades to 10 to 12 inches in the eastern and southeastern parts of the District. Average monthly and annual precipitation, and the periods of record, for selected stations are shown in Table 1. The variation of seasonal precipitation over the district is shown by the isohyetal map following this page.

Precipitation not only varies from season to season and area to area within the district, but also varies considerably from year to year. Table 2 shows the precipitation at Klamath Falls for the periods of record from 1884 to 1952. During this period annual precipitation has varied from 8.3 inches, 63 percent of average, to 20.9 inches, or 157 percent of average.

Much of the precipitation received in this area occurs as snow. Several snow courses have been measured for a number of years in the area. The average water equivalent of the snow catch of these snow courses is shown in Table 3. It will be noted from these data that the maximum snow storage generally occurs in March for the low altitude courses and in April at the higher altitudes. Average maximum amounts vary from less than 1 inch water equivalent at Beatty to 60 inches at Crater Lake Park Headquarters. Probably even higher amounts occur in parts of the Cascades. Observations indicate that the snow at low altitudes melts early in the spring, April and May, but that some high altitude snow persists through most of the summer.

Temperature

Temperatures and growing seasons are also variable over the district. Temperatures are low and growing seasons are very short at high altitudes in the Cascades. Weather Bureau temperature normals for selected stations for months and the year are shown in Table 4. Maximum and minimum temperatures vary considerably from these averages, extremes at Klamath Falls having been about 105°F and -24°F.

Average growing seasons, as shown in "Climate and Man", 1941 Yearbook of Agriculture, are:

Station	Average Growing Season - Days
Klamath Falls	131
Dairy (Yonna)	108
Malin	110

Killing frosts have been observed in Klamath Falls in every month of the growing season with the possible exception of August.

Water Supplies

Water supplies for agriculture in this district are obtained from four principal sources: Streamflow, lakes, ground water and springs.

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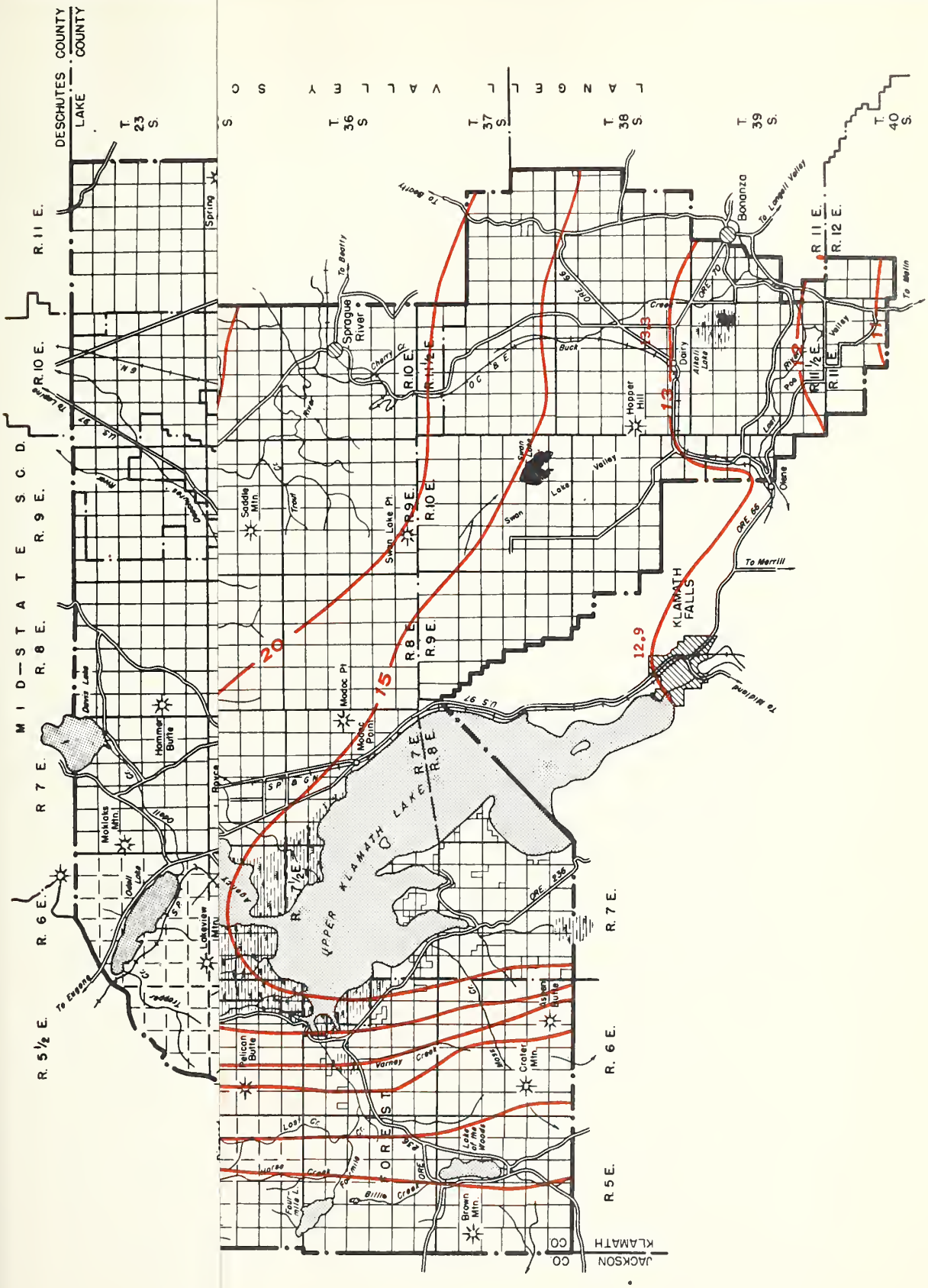

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KLAMATH COUNTY, OREGON

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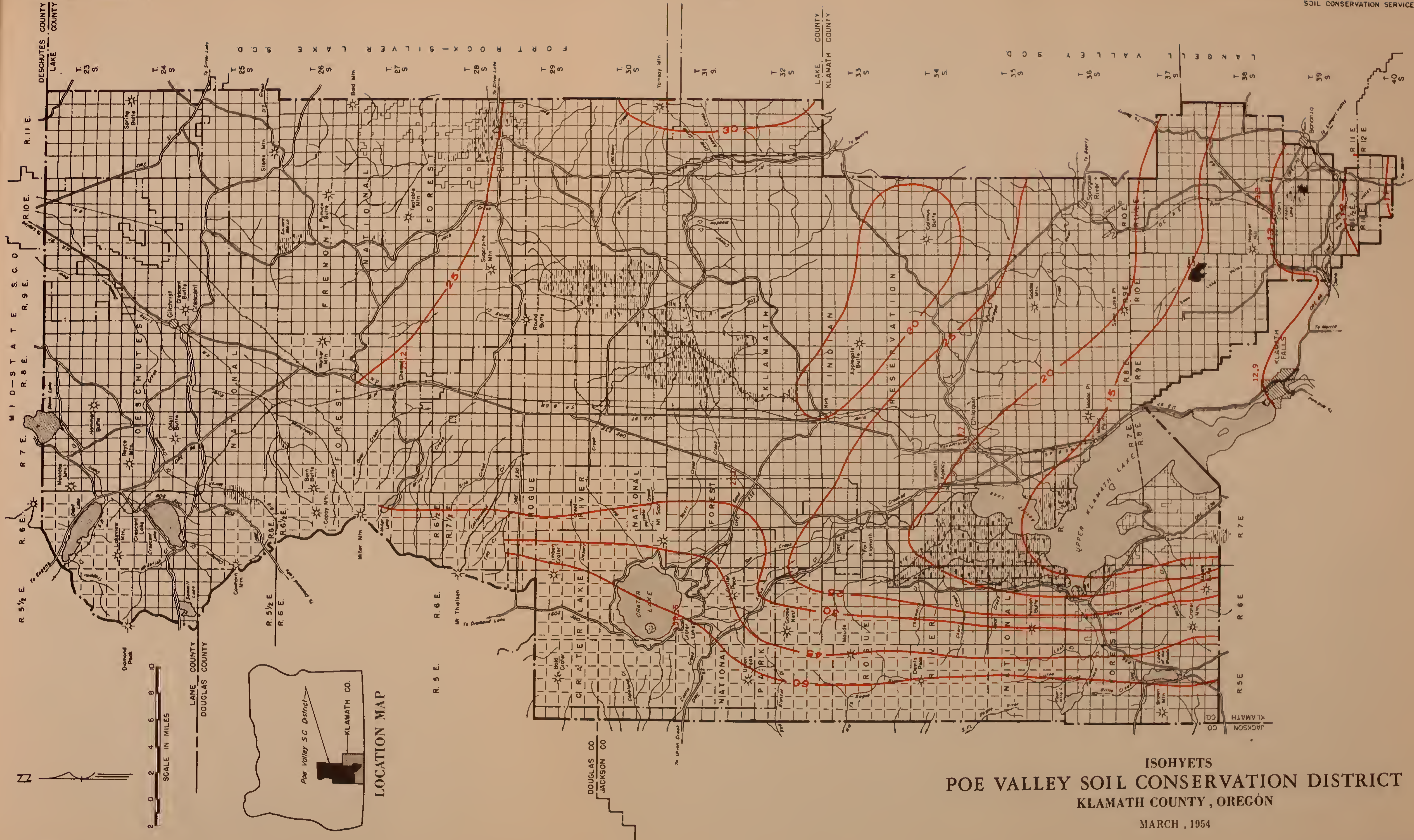

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POE VALLEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

MARCH, 1954

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AGR-SCS-PORTLAND, ORE APRIL 1954

Table 1 - AVERAGE MONTHLY AND ANNUAL PRECIPITATION, INCHES, FOR SELECTED STATIONS

	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Average Annual
Sand Creek 1929-1948	1.98	3.76	4.71	4.95	3.30	2.71	1.61	1.56	1.15	0.43	0.38	0.58	27.12
Round Grove 1919-1933 1933-1948	1.29	1.95	1.99	1.46	1.81	1.63	1.36	1.49	1.29	0.40	0.33	0.86	15.86
Yonna, El. 4147 1907-1948	1.07	1.87	1.83	1.72	1.47	1.09	1.07	1.07	0.87	0.34	0.26	0.58	13.26
Klamath Falls 1908-1952	0.99	1.71	1.86	2.05	1.50	1.17	0.91	0.91	0.72	0.27	0.25	0.55	12.89
Merrill 1909-1928	1.17	1.73	1.42	1.12	0.96	0.61	0.80	0.72	0.66	0.38	0.30	0.43	10.35
Malin 1926-1946	0.95	1.50	1.49	1.36	1.37	1.11	1.06	1.04	0.78	0.18	0.11	0.50	11.45

Table 2 - ANNUAL PRECIPITATION AT KLAMATH FALLS
FOR PERIOD OF RECORD

Year	Annual Precipitation	Year	Annual Precipitation
1952	-	1911	9.73
1951	15.71	1910	14.70
1950	18.13	1909	17.67
1949	8.31	1908	10.02
1948	20.91	1907	16.67
1947	11.32	1906	14.87
1946	11.46	1905	8.32
1945	16.52	1904	15.04
1944	12.42	1903	-
1943	13.82	1902	11.26
1942	14.09		-
1941	19.71		-
1940	17.12	1889	10.40
1939	11.99	1888	13.75
1938	13.05	1887	10.71
1937	19.41	1886	18.06
1936	12.64	1885	18.71
1935	11.25	1884	17.94
1934	10.74		
1933	11.01		
1932	9.84		
1931	9.50		
1930	9.44		
1929	8.56		
1928	11.65	Mean	13.25
1927	15.47		
1926	13.23		
1925	14.26		
1924	11.28		
1923	9.85		
1922	15.19		
1921	11.94		
1920	12.22		
1919	9.40		
1918	9.51		
1917	10.22		
1916	10.98		
1915	11.72		
1914	11.42		
1913	16.11		
1912	19.56		

Table 3 - AVERAGE WATER CONTENT FOR PERIOD OF RECORD OF SNOW COURSES IN AND AROUND POE VALLEY SOIL CONSERVATION DISTRICT

Snow Course	Elevation	Year Records Began	Average Water Content, Inches, About First of January	February	March	April	May
		Stations Measured by California Oregon Power Company					
Beatty	4300	1927	0.2	0.8	0.2	0.0	-*
Chiloquin	4187	1927	0.8	2.1	1.5	-	-
Crystal	4200	1929	3.0	6.2	7.8	4.9	-
Ft. Klamath	4150	1926	1.3	3.8	3.8	0.9	-
Kirk	4533	1926	2.4	5.2	6.1	1.8	-
Harriman	4200	1926	1.6	3.7	4.0	0.8	-
Bby 101 Ranch	4800	1926	0.7	2.0	1.6	0.0	-
Yamsey	4600	1928	1.1	2.1	2.4	0.5	-
		Stations Measured by Soil Conservation Service and Cooperators					
Annie Sp.	6018	1929	13.8	26.0	36.3	43.7	38.6
Chemult #1	4760	1936	3.6	7.4	10.4	7.8	0.3
Gerber	4850	1949	2.7	4.2	4.7	-	-
Lake O Woods	4960	1936	3.2	6.2	8.2	9.4	5.9
Park Hg	6450	1943	19.7	30.1	49.2	60.0	57.9
Quartz Mt.	5320	1929	2.9	4.8	5.6	4.2	-
Strawberry	5600	1938	-	5.5	8.4	5.0	-
Summer Rein	7200	1936	-	-	12.8	16.1	-
Sun Mt.	4350	1937	10.2	15.9	22.9	26.3	-
Taylor Butte	5700	1937	-	3.3	-	3.3	-
Billie Creek Divide	5300	1938	9.3	14.6	21.5	23.4	24.8
Hyatt Prairie Res.	4900	1936	4.3	6.6	9.8	8.7	4.4
Crowder Flat	5200	1940	-	2.7	3.2	0.1	-

* Not measured

Table 4 - NORMAL MONTHLY AND ANNUAL TEMPERATURES AT SELECTED STATIONS IN KLAMATH FALLS AREA

January	February	March	April	May	June	July	August	September	October	November	December	Annual
Crater Lake												
26.4	27.1	30.1	34.7	41.0	48.0	56.6	56.0	48.7	41.5	33.4	27.1	39.2
Klamath Falls												
29.0	33.3	39.6	46.6	53.4	60.1	68.2	67.2	58.9	49.5	38.7	31.3	48.0
Round Grove												
26.7	30.0	35.0	40.2	47.3	53.1	62.5	61.1	53.5	45.0	36.1	29.2	43.3

Nearly all of Lost River flow is used for irrigation. Relatively small percentages of total flow of the Sprague and Williamson Rivers are utilized. Wood River flow is only partially utilized. Klamath Lake water is used in Poe Valley, around the lake and below the lake outside the Poe Valley Soil Conservation District. Ground water is being developed in Swan Lake Valley and Yonna Valley but not much is being used elsewhere. The springs forming the source of Wood River are being partially utilized. Very little of Big Spring water, tributary to Williamson River, is being used. Of all the water supply sources in the area, Lost River and Klamath Lake are the only sources being utilized to anywhere near their full capacities.

A few large springs exist in this area. The most important of these are Big Spring with an average flow of about 300 cubic feet per second, which is the source of Big Spring Creek, and Bonanza and Wood River Springs near Ft. Klamath which are the source of Wood River. These latter average about 75 and 300 cubic feet per second flow, respectively. The flow of these springs is relatively constant, varying little from season to season and year to year.

Average monthly and annual stream flow of the major streams of this area, as measured and computed by U. S. Geological Survey, the State of Oregon, Indian Service and Bureau of Reclamation (Tabulations supplied by Bureau of Reclamation) are shown in Table 5. It will be noted from these data that the flow of Wood River and Williamson River above Sprague River are fairly uniform throughout the year. This is no doubt due to the large springs and marsh that supply much of the flow of these two rivers. The flow into Klamath Lake and the flow of all other rivers and streams are typically high in the spring during snow melt season and low in the summer.

This high stream flow during the season of low water demands for crops points up the need for storage reservoirs on most of the streams in this area if their total water yield is to be used for irrigation. If storage cannot be provided, the areas that can be irrigated from stream flow are limited to the low summer stream flow. Flows of all of the streams in the area not supplied by big springs are very low during the summer high demand season.

In order, therefore, for the streamflow water resource of this area to be fully utilized, storage reservoirs must be constructed on the Sprague, Sycan, Williamson and Lost Rivers and/or their tributaries. Because of the land ownership pattern and the social and economic problems involved, chances of providing storage on the Williamson, Sycan and Sprague Rivers in the immediate future are poor.

This brings into prominence the possible development of ground-water resources in these river valleys for the irrigation of privately owned land. As discussed elsewhere in this report, ground water is being developed in Yonna and Swan Lake Valleys. This is largely the extent, however, of ground-water developments in the district. It would appear highly desirable to explore the possibilities of good aquifers

Table 5 - AVERAGE MONTHLY AND ANNUAL STREAM FLOW AT SELECTED STATIONS AS MEASURED AND COMPUTED IN THOUSANDS OF ACRE FEET*

Station	Period	Drainage Area	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Annual
		Sq.Mi.													
Wood River	1912														
Nr.Ft.Klamath	1951	-	14.4	14.6	14.6	14.0	13.0	14.8	15.0	13.8	12.9	12.6	12.0	12.5	164
Flow into Upper	1904														
Klamath Lake	1951	3812	88.1	98.7	117.0	118.1	123.7	166.3	170.6	151.6	104.0	85.5	82.5	83.0	1389
Lost River	1904														
Nr. Olene	1951	1270	7.6	7.5	9.4	14.4	20.4	29.4	26.0	10.2	8.0	7.1	7.4	7.8	155
Miller Creek	1904														
At Gerber Dam	1951	220	0.30	1.20	2.41	3.47	7.13	16.28	13.94	2.74	0.80	0.17	0.13	0.14	49
Williamson River	1917														
Below K. Marsh	1949	1336	2.72	4.64	5.67	4.40	5.66	14.30	17.43	9.14	3.72	2.00	1.75	1.77	73
Williamson River	1927														
Above Sprague R.	1949	1395	20.1	20.0	20.8	20.6	20.3	28.3	30.4	24.2	19.4	18.6	18.7	18.6	260
Williamson River	1917														
Below Sprague R.	1949	-	36.5	38.6	43.9	44.5	49.7	76.2	99.0	83.3	50.2	34.3	32.6	32.4	621
Sycan River	1911														
Nr. Beatty	1949	527	0.58	1.04	1.23	1.18	2.86	13.50	21.46	20.6	7.02	1.10	0.55	0.49	72
Sprague River	1927														
Nr. Beatty	1949	513	4.18	4.49	8.84	8.99	10.07	17.01	27.71	24.15	12.07	5.33	4.66	4.38	132
Sprague River	1920														
Nr. McCready Road	1931	1546	16.1	17.1	20.6	19.0	25.9	40.6	51.5	54.1	27.0	15.1	13.6	13.2	314
Sprague River	1911														
Nr. Chiloquin	1949	1647	17.2	18.6	22.0	23.3	26.9	46.4	68.9	61.3	33.1	17.2	15.2	14.6	365

*Tabulations supplied by U. S. Bureau of Reclamation

existing in Sprague River Valley and around the periphery of Klamath Marsh. Observations indicate that ground-water supplies may be found in parts of these areas sufficient to irrigate the land lying above such ground-water aquifers.

The ground-water resource of the district is no doubt large. The large springs in the area are indicative of this. It would appear highly desirable to make a rather detailed investigation of this resource from and including Sprague River Valley north to the district boundary.

The water resources of the Klamath Basin, of which Poe Valley Soil Conservation District is a part, are presently being studied by commissions of the States of Oregon and California.

AGRICULTURAL PROBLEMS

The agricultural problems of this district are complex because they are not only made up of the physical aspects of the area but have superimposed on the physical problems, as do most districts, economic problems. Physical aspects include drainage; reclamation of marsh areas; proper development and utilization of presently available irrigation water; obtaining new supplies of irrigation water; proper management and restoration of range land; disease, noxious weed and insect control; reforestation; soil alkalinity and salinity and others.

A present seemingly insoluble problem superimposed on the physical problems is that of land ownership. Much of the area is within the Klamath Indian Reservation with Indian lands being owned by the tribe, allotted to individuals or deeded to individuals. Tribal income is presently of such size on a per capita basis that there is no great incentive for Indian operators of land to develop such land to a high degree of productivity. Some progress is being made in developing these Indian lands, but progress is slow. This is also a deterrent to improveing range land and forest land on the Indian reservation. While progress is being made in developing the proper management of the ranges, harvesting of timber products, reforestation of forests, and insect and disease control, attaining the optimum will be a slow process.

Agricultural problems of this area are not uniform throughout the district but vary rather markedly from one area to another. In view of this it was deemed most appropriate to discuss the agricultural problems and their possible solutions area by area rather than problem by problem. The more prominent of these problems are discussed hereafter by area or locality. Acreages involved are shown in Table 6 on page 22.

These conclusions were reached after personal observations and discussions with local technicians of Soil Conservation Service, Indian Service, Bureau of Reclamation, etc.

Fort Klamath Area

This area lying to the west and southwest of Fort Klamath and north of the lakes is devoted almost entirely to production of irrigated

pasture and beef cattle. Some hay is harvested and limited areas are in row crops and small grain. The irrigated pastures are made up primarily of sedges and blue grass and wild flooding is resorted to for irrigation.

The agricultural productivity of this area could be more than doubled by properly developing the land for irrigation, following good irrigation practices, seeding desirable grasses and legumes, and proper fertilization. Two fields were observed that were recently so treated. They are indicative of the potentiality of this area.

Along the southern edge of this area adjacent to the lake there is a rather large acreage of marsh and semimarsh land that could be reclaimed. Some of this reclamation is now in progress. Reclamation of the area will require diking, land clearing and subjugation, drainage and irrigation. Pumping will be necessary for drainage. In some of the areas, particularly along the foothills on the west side, it may be necessary to divert hill runoff by a system of diversion ditches and dikes to reduce the amount of water that will need to be pumped from the area for drainage. Irrigation water can be obtained from the lake by gravity flow for part of the area and low lift pumping for the remainder.

The reclamation of part of this area at least, however, may be in conflict with the aims and desires of the Fish and Wildlife Service. Some of this marsh area is a wildlife refuge. The relative economic, aesthetic and recreational values of these wildlife areas, if conducted as wildlife refuges or converted to farm land would need be determined before reclamation is initiated.

Modoc Point Area

This area is situated along the lower Williamson river between Agency and Upper Klamath lakes. A large part of this area is contained within a corporation -type farm where an excellent job of reclamation and land management is being done. The remainder of this area is in private or Indian ownership in relatively small parcels. Drainage and alkalinity are the major problems in the area. It would appear that the solution of the drainage problem is dependent on the development and installation of a master community drainage system. With such a master system installed, individual owners could then more adequately drain their own holdings by the installation of farm and field drainage systems. Soil amendments and treatment could then be effectively applied to correct the alkalinity condition.

Poe Valley

This area is situated along Lost River between Olene and Bonanza. It is one of the older irrigation districts within the soil conservation district. Irrigation water is obtained by means of a canal from Klamath Lake and from Lost River.

Agricultural problems observed in the area include inadequate or deteriorated drainage in some areas and lack of irrigation water for a few high or isolated fields. There is a possibility that ground water could be utilized in some instances for the irrigation of some of these areas not now having adequate water supplies. Pumping from presently installed irrigation canals could also be resorted to. This is now being done for irrigating some fields overlying such canals.

The drainage problem in the Valley is rather closely associated with the water level in Lost River. A diversion dam just below Olene holds the river water to within approximately three feet of the land surface at the lower end of the Valley. The river gradient through the valley is very low, hence the water level in the river is not much more than three feet below the stream banks of the river through the valley. This low outfall tends to create high water table conditions in some of the valley lands.

It would appear that the water level at the diversion dam below Olene should be held at the lowest possible stage in order to increase as much as possible the outfall of the river. It is possible that the entrance conditions of the irrigation canal could be improved at the diversion dam to permit lowering the water stage somewhat.

It would appear desirable to continue improving the channel of Lost River itself throughout the valley in order to make it as efficient hydraulically as possible. Such increased hydraulic efficiency would permit the river to carry its flow at a lower hydraulic gradient and thus permit a recession of the ground water table through the valley.

Buck Creek-Alkali Flat-Yonna Valley Area

This area situated between Dairy and Bonanza and northward along the valley of Buck Creek has as its primary agricultural problem a deficient irrigation water supply. Water available during the irrigation season in Lost River and Buck Creek is now being fully used.

An increase in irrigation water could probably be obtained by construction of a storage reservoir on Buck Creek itself. It is very doubtful, however, if the water yield of the Buck Creek drainage area is sufficient to satisfy ultimate needs of irrigation water in this area. Also, the ground-water resource may be further developed.

A reservoir on Buck Creek, added to complete utilization of the probable ground water supply, would provide irrigation in Yonna Valley for more than 8,000 acres where 2,500 acres were irrigated from 20 wells in 1950. Average depth of these wells is about 325 feet with two approaching 1,000 feet.

The future irrigation potential is indicated by the following quotation from a 1952 U. S. Geological Survey report of ground-water resources of the Swan Lake-Yonna Valleys area.

> " * * * If it is estimated that an over-all aggregate of 2 inches of precipitation per year infiltrates and reaches the regional ground-water table, about 10,000 acre-feet of water will be added to the regional ground-water body in the Swan Lake Valley area (including Pine Flat) and about 13,000 acre-feet in the Yonna Valley area (north of the Horsefly Irrigation District) annually. Those figures are rough estimates warranted only by the present lack of data for closer approximations. As such they would suggest, broadly, that the ground-water resources at their maximum development, allowing 2 feet per acre for irrigation, would provide water for a maximum of about 5,000 acres in Swan Lake Valley and about 6,500 acres in Yonna Valley."

A secondary problem on Buck Creek has been one of spring floods during the snow melt season. The channel of Buck Creek has been realigned and improved through much of its length, however, and this flood problem has been abated somewhat. Some additional improvements are needed to further abate flood damages. The possibility of developing a combination flood control and irrigation reservoir on Buck Creek should be investigated, since such a reservoir would not only reduce flood flows but provide additional irrigation water for the valley.

Swan Lake Area

This area surrounds and extends to the south of Swan Lake. It is apparently the bed of a once much larger Swan Lake. The present lake is small and has no outlet from the valley. Only during exceptionally wet seasons would flow from the valley to Lost River be expected.

The existence of a ground-water aquifer that yields copiously to wells was recently discovered in this valley. The drilling of wells and development of this resource proceeded apace until the State Engineer refused to permit additional wells to be drilled until a study could be made of the ground-water resources of the valley. This study has now been completed and new wells are being drilled and the development of the ground water is proceeding again.

A study of the ground water of this area, made recently by U. S. Geological Survey, indicates that there probably will not be sufficient ground-water yield to irrigate all of the irrigable land in the valley. This would indicate that it should be vitally important to the land owners of the valley and the community as a whole to observe rather carefully the effects on the ground water table of the development of this resource. Such a well observation program should be instituted immediately and continued for several years in order to preclude over development and pumpage and possibly permanent deterioration of the aquifer.

This probable lack of total water supply for all of the irrigable land in the valley also points up the desirability of using available water as efficiently as possible. This entails adoption of the best irrigation methods possible, careful land preparation, properly designed irrigation systems, and an alert and informed group of irrigators. The economy of the community cannot afford over irrigation and concomitant wasting of inadequate water supplies.

An associated problem of the development of irrigation in this valley will be that of drainage. As indicated above, the valley has an inferior drainage system. Tail water from irrigation will of necessity run into the lake. With full development the lake and peripheral marshy areas will grow in extent. Saline and alkali problems may also be encountered.

There appears to be two solutions of this potential drainage problem. One would be to cut a canal from Swan Lake to the south and drain excess water from the valley to Lost River. The experience of one or two ranchers in the area indicates the possibility and practicability of the other solution, that of using wells for disposing of excess water. This latter solution would have the advantage of putting the drainage water back into the ground-water reservoir. If other wells perform as effectively for drainage as the one or two that have been used to date for this purpose, this type of drainage system would probably be more economical than a canal system. It would have the added advantage of conserving for valley use water that would otherwise be lost to the valley.

Sprague River Valley

Only the lower part of Sprague River Valley area is within the Poe Valley Soil Conservation District, the upper part of the river valley is within the Langell Soil Conservation District. Only that part of the valley lying within the Poe Valley Soil Conservation District will be discussed hereafter.

This problem area is situated along the Sprague river from the vicinity of the town of Sprague River to the vicinity of the town of Chiloquin, or the junction of Sprague and Williamson rivers. This problem area is within the Indian reservation and the land ownership pattern is very complex. The Indian lands along the valley are mostly allotted or deeded but some tribal lands still remain. Intermingled with this Indian land are tracts of land owned by non-Indians. The highest development of this land is retarded because of the ownership pattern. The formation of community drainage and irrigation districts is almost impossible under the present circumstances.

The principal agricultural problems of this area are those of flooding, inadequate drainage and lack of irrigation water. These problems are rather closely a ssociated insofar as their solution is concerned.

The present non-regulated flow of the Sprague River is inadequate to supply water to all of the irrigable land in the valley. The present river channel is tortuous, brush and tree grown, and inadequate to carry flood flows. Drainage is impeded by high stages in the river and lack of community ditches and canals.

The ultimate solution of this problem would appear to be the construction of a multiple purpose irrigation-flood control reservoir on the Sprague River. Such a reservoir would serve to reduce flood flows and conserve flood water for later use for irrigation. The Indian Service has investigated the feasibility of constructing a reservoir on Sprague River and a canal to convey water from the Sycan River to the reservoir on Sprague River. These preliminary investigations and studies indicate such a reservoir would significantly reduce flood flows on the Sprague River and furnish water for approximately 40,000 acres of land. These preliminary studies indicate such a reservoir would be both physically and economically feasible.

It is possible that some of the lands in the lower Sprague River Valley could be irrigated from ground water. Insofar as is known, no complete exploration nor study of the ground-water resources of the valley has been made. A few artesian wells have been developed above the town of Sprague River. It is not known if this aquifer extends to the lower valley. It would appear highly desirable to undertake ground-water exploration in the immediate future and, if ground water is available, develop it for irrigation of as much land as owners desired to irrigate.

In the interim, the flood problem will continue to constitute a hazard to the valley. This will be a deterrent to the development of some of the lands. Removal of restrictions in the channel of the river at a few points would increase considerably its hydraulic efficiency and reduce the frequency of flooding. One such restriction exists just above Chiloquin at an old mill site. This one is typical of several such restricted reaches in the channel.

The river should be examined rather closely from its mouth to the town of Sprague River to locate all such restricted reaches and determine what will be necessary to improve such reaches. Costs of such improvements should be compared to potential benefits to determine whether or not it is economically feasible to undertake such works of improvement.

Williamson River Area

This area includes the Williamson River Valley land north of Chiloquin and the valley land of Big Spring Creek. This area is largely undeveloped but is substantially good irrigable land. It needs clearing and subjugation and the development of an irrigation system. It is believed that adequate water supplies are available from Big Spring Creek and the Williamson River. This land is also within the Indian reservation and many of the owners are not particularly interested in its development. But for this problem, this would be one of the easiest areas of the district to reclaim and put into high productivity.

Klamath Marsh Area

This area lying astride the Williamson River is a large expanse of marshy grass land and shallow lake. A basaltic reef across the Williamson River in the vicinity of Kirk holds up the flow of the Williamson River and maintains this area in its marshy condition.

Parts of the a rea are now in a limited grazing use. Sedges and other water loving plants predominate, hence the quality and quantity of forage produced is low. Also much of the area is inundated for greater or lesser parts of the grazing season and cannot be utilized.

The productivity of this area could be increased materially by drainage. Such a drainage system should include opening up the reach in Williamson River near Kirk and canalization of the marsh itself. An integral part of such a drainage system should be flash board dams that could be utilized to control the water level in the marsh during dry seasons.

An additional source of irrigation water would be required to put this marshy area into fullest productivity. Indian Service has investigated the possibility of storage on upper Williamson River and in the Klamath marsh itself. Their findings indicate that it would be possible to find sufficient storage sites to provide water needed within this area.

Klamath marsh lies within a much greater expanse of volcanic ash and pumice. How deep this pumice bed is is not known nor is it known whether or not this material contains ground water and would serve as an adequate aquifer for supplying irrigation w ater to the area. It is highly probable, however, that such ground-water resources do exist in this area. It is deemed highly desirable to explore this possibility.

The physical problem in this area is complicated by the land ownership pattern. Land ownership is divided between the tribal, allotted and deeded Indian land and non-Indian ownership. One of the largest free holders in the area operates a very large livestock enterprise, which includes holdings in several localities and apparently is not interested in intensively developing this area. Some other holders, while not controlling such large acreages, are seemingly not interested in developing the area because of their tribal incomes.

Range Land Area

This area extends from Poe Valley to and slightly north of the Sprague River Valley and includes the series of parallel ridges lying between Klamath Lake, Swan Lake, Buck Creek and Langell Soil Conservation District. Parts of the area are open grass-sagebrush-Juniper cover. Intermingled with this type of cover are patches of greater or lesser size of coniferous timber stands. Most of this timber is rather sparse and contains few trees of commercial value.

Most of the area has been so over grazed and mismanaged in the past that the original perennial grasses have all but disappeared. Nearly all of this range is now cheat grass and weeds in poor to fair condition with only scattered patches in good condition class. Rehabilitation of this range poses a serious problem. As indicated above, only scattered remnants of original bunch grasses remain. It is doubtful if there is sufficient such remnants that the bunch grass stands could be reestablished in a reasonable length of time by the best of management practices. The encroachment of noxious weeds and woody plants is adding to the difficulty of range rehabilitation.

The soils, topography and semiforested conditions on much of this area are such that it would be impractical to mechanically reseed the area. Selected areas where soils and topographic conditions permit could be reseeded profitably. However, climatic conditions are such that very careful management would be required to obtain and maintain good stands of seeded grasses. It is entirely possible that seeded areas would need reseeding one or more times before a stand is obtained.

It can thus be seen that the improvement or rehabilitation of this range land would be difficult and expensive. It is suggested that some trial reseeding and management plots be established and observed for a few years before any attempts are made to rehabilitate the range on a large scale.

Pumice Bed Area

This area includes the volcanic ash beds in the north approximately two-thirds of the district, surrounding Klamath Marsh. The area is one of almost pure pumice. The area is geologically so youthful that only a very shallow soil has developed. In much of the area also a semicemented and near impervious ash stratum exists a few inches to a few feet below the surface. Characteristically the area with this restricting layer is occupied by lodgepole pine whereas the areas without such impeded underdrainage are occupied by Ponderosa pine.

This large expanse of pumice beds extends from near the Sprague River into the National forests surrounding the northern part of the Indian reservation. It is primarily owned by the Indians with tribal, allotted and deeded lands occurring. Parts of the area are owned and controlled by cattlement and sheep men. Still other parts are owned by lumber companies and paper and pulp companies. This complex ownership pattern poses a difficult problem for the improvement of this area.

There is a possibility that, if water were available for irrigation and this land were properly fertilized after clearing and subjugation, it could produce good pasture and meadow. It would seem highly desirable to determine, by installing some plots or small field trials, whether or not grasses can be profitably produced on this area. One such trial plot is planned for the H. McCoy Jones ranch just north of Sand Creek. Planting is planned for the spring of 1954.

As of the moment most of this extensive area is practically an economic nonentity to the community. The only returns being obtained from the lodgepole pine area are small returns from grazing and the cutting of a little fire wood and poles and posts. Very largely, however, the area is lying idle. It appears that vigorous efforts should be made to develop profitable commercial uses of the lodgepole pine poles that predominate in the area.

Scattered throughout this lodgepole pine flat are islands of greater or lesser extent of Ponderosa pine. This is currently being harvested. Natural reforestation, however, is apparently not keeping pace with logging. It would seem desirable to institute immediately a program of tree planting in areas already logged and those now being logged, so that Ponderosa pine will again be the climax vegetation of the areas where it is adapted. Control of weed trees and brush that compete with, and choke out, Ponderosa pine seedlings or plantings is also needed.

The fire control record of this area is seemingly good and apparently the present status of fire control is adequate. Bark beetle and spruce bud worms are doing some damage to this area. Additional controls are needed for these forest insects. Some young pines, particularly, are being damaged by porcupines. Possibly if a reforestation program is undertaken, control measures will be needed for this rodent.

Access roads are not much of a problem in this forested area because the topography is generally level or very gently rolling and road construction material (pumice) is everywhere available.

Mountainous Western Area

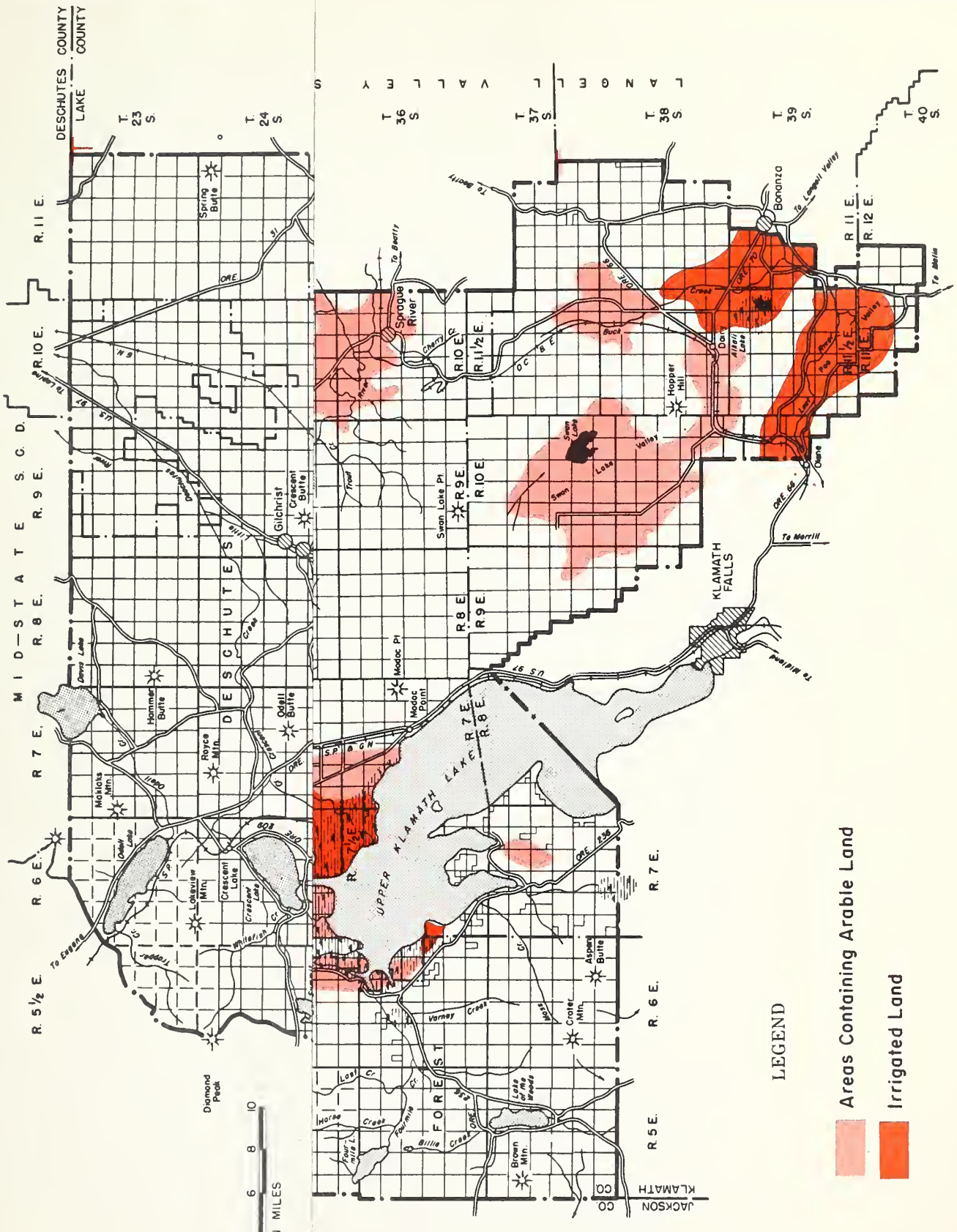
This area lies along the eastern slopes of the mountains bounding the western side of the district. Practically all of the area is either a part of the Crater National Park or of the Deschutes and Rogue River National Forests. The area contains stands of Douglas Fir, Ponderosa pine, spruce, true firs, lodgepole pine, etc. A part of the area has been or is being logged. Much of it, however, still contains virgin timber. When and if demands for additional commercial forests develop, and it may be in the relatively near future, access roads, burning of slash and reforestation will become problems in the area. Insofar as is known at this time these problems are not acute. It is assumed since most of this land is within the National forests, that these problems will be coped with and solved, as they arise, by the U. S. Forest Service.

IRRIGATED AND IRRIGABLE AREAS

The Bureau of Reclamation, Indian Service, and the States of Oregon and California have been and are investigating irrigated and irrigable areas in the Klamath River Basin. A generalized map of arable and irrigated areas prepared by the Bureau of Reclamation was the basis for making the map following this page which shows the general arable and

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



ARABLE and IRRIGATED LAND

LEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

MARCH, 1954

7-Sd-14138-N

AGR-SCS-PORTLAND, ORE. APRIL 1954

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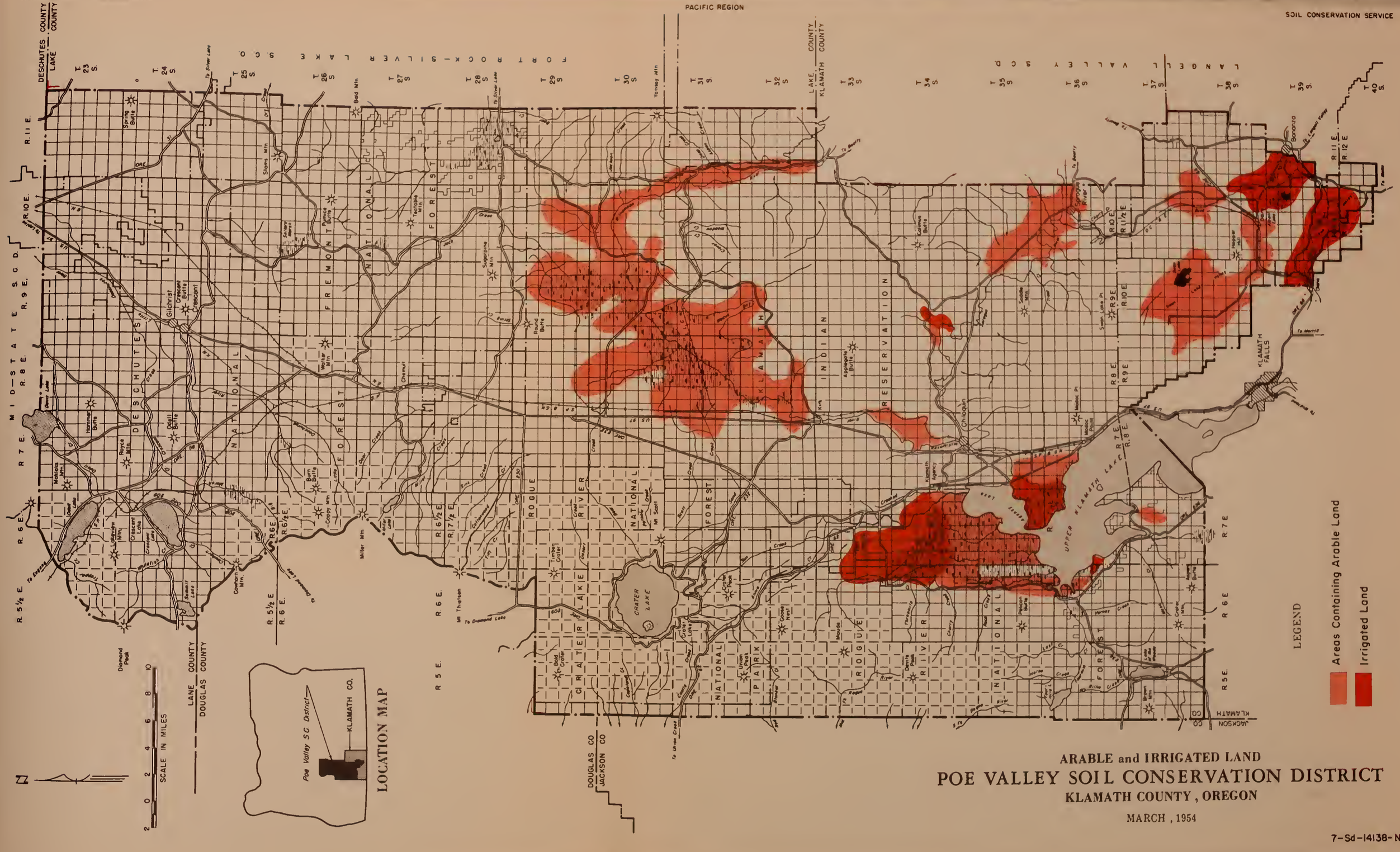

ARABLE and IRRIGATED LAND

POE VALLEY SOIL CONSERVATION DISTRICT

KLAMATH COUNTY, OREGON

MARCH, 1954

7-Sd-14138-N

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irrigated areas in Poe Valley Soil Conservation District. The arable lands shown on the map are considered irrigable. Acreages of arable (irrigable) and irrigated lands in the district are about as shown in Table 6.

Table 6 - APPROXIMATE ACREAGES OF ARABLE AND IRRIGATED LAND BY AREAS

Principal Valley Area	Approximate Acreages of Land		
	Irrigated	Irrigable	Total Arable
Existing Klamath Project and Contiguous Areas 1/	127,667 (12,767)	62,502 (6,250)	190,169(19,017)
Yonna Valley (Buck Creek)	5,700	7,042	12,742
Swan Lake Valley	6,550	18,223	24,773
Wood River Agency and Modoc Point Areas	50,000	39,381	89,381
Sprague River Valley 2/	13,214 (2,643)	62,007 (12,401)	75,221(15,044)
Klamath Marsh and Williamson River Areas	12,000	77,016	89,016
Totals 3/	89,660	160,313	249,973

1/ About 10 percent within Poe Valley Soil Conservation District.

2/ About 20 percent within Poe Valley Soil Conservation District.

3/ Approximate areas within Poe Valley Soil Conservation District.

The above total acreage is somewhat higher than the total acreage, 210,000, in Classes I through V shown on page 4. Since the sources of both sets of data, land classes and arable areas, were generalized and based on reconnaissance surveys, the discrepancy in the two sets of data are no more than that to be expected. These independent estimates indicate a maximum potential of 210,000 to 250,000 acres of crop land in this district. All of this is irrigable, from a soils standpoint, if water supplies can be made available. Only about one-third is now irrigated. Potential new irrigated lands, some 160,000 acres, represent a resource of considerable magnitude in the future economy of the district.

Water requirements for irrigated land in this district vary with the crops grown and from one area to another. Station Bulletin 500, "Irrigation Requirements (Estimates for Oregon)", issued by the Agricultural Experiment Station, Oregon State College, Corvallis, indicates that the growing season in the Klamath Area averages about 120 days. Consumptive use requirements of various crops adaptable to this area, as shown in the bulletin referred to above are:

Crop	Consumptive Use (Inches)		
		Peak Demands	
	Season	Monthly	Daily
Hay	18.0	5.9	0.286
Legume Seed	19.2	5.54	0.268
Pasture, grass	19.2	5.54	0.268
Pasture, Ladino	20.4	5.9	0.286
Potatoes	18.0	5.2	0.252
Small Grain	18.0*	5.9	0.286

*Estimated

Total water requirements will exceed the above amounts by about 100 percent, making seasonal demands approximately 36 inches. Indian Service and the Bureau of Reclamation indicate that the maximum demand is in June with 29 percent of the seasonal requirement needed in this one month. June requirements, then, will average about 10.4 inches or 0.87 acre foot per acre of crop land. One acre foot of water would, therefore, be sufficient for 1/0.87 = 1.15 acres of land during the peak month.

This figure can be used to convert the stream flow shown in Table 5 to acres that unregulated average stream flow could irrigate. Actually, areas that could be irrigated would be somewhat less than this due to the fact that safe water yield is somewhat less than average.

On the basis of average stream flow, however, the data in Table 5 and the figure of 1.15 acres per acre foot of water indicate that unregulated stream flow in this district would water:

Stream	Average June Flow Acre Feet	Potential Irrigated Area Natural Flow Acres (Rounded)
Williamson River below Klamath Marsh	3,720	4,300
Williamson River above Sprague River (Includes Big Spring)	19,400	22,300
Sycan River near Beatty	7,020	8,100
Sprague River near Beatty	12,070	13,900
Sprague River near Chiloquin	33,100	38,100
Total for Area		86,700
Total Irrigable Land in Area*		253,600

*Exclusive of Sycan Marsh

It will be noted from the above that there is natural streamflow in this area sufficient to irrigate only one-third of the irrigable land. This indicates, as shown earlier in this report, that storage reservoirs will be required before full development of land is possible in this area.

SUMMARY AND RECOMMENDATIONS

Based on observations made, information obtained from technicians and data studied, the following summary and recommendations are submitted for consideration.

1. The greatest immediate gross returns to the community could be obtained by improving irrigation methods and practices; properly preparing lands for irrigation; reseeding pastures to better grasses and legumes, and applying limestone, fertilizers and other soil amendments as required in the area around Ft. Klamath and above Upper Klamath Lake. It is recommended that vigorous efforts be made immediately to accomplish this.

2. Total potential ground-water supplies appear, from the U. S. Geological Survey Report, to be inadequate to water all of the irrigable land in Swan Lake Valley. Also, there is acute danger of a serious drainage problem arising in this area if proper facilities are not provided, and inefficient irrigation practices and methods are adopted. It is recommended, therefore, that all possible technical assistance be rendered in this area to insure the most efficient irrigation methods and practices possible be adopted, and that adequate drainage facilities are installed.

3. A community drainage system is needed in the Modoc Point area in order that farm and field drainage systems may be installed, and the soils treated for alkalinity. It is recommended this be prosecuted vigorously.

4. There is a pressing need for irrigation water on some privately owned lands in Sprague River Valley. The land ownership, social and economic problems are such, in this area, that it appears improbable that a large community-type irrigation project can be installed within the near future to supply needed irrigation water. It is recommended, therefore, that ground-water resources be investigated in the valley with a view towards supplying present needs for irrigation water on scattered privately owned land.

5. There is apparently a shortage of irrigation water for all potentially irrigable lands in Buck Creek (Yonna) Valley. It is probable that ground water is available in this area to supply most such needs. It is recommended that reservoir sites be investigated to store excess Buck Creek flow, and that the ground-water resource be further explored.

6. The Williamson River - Big Spring Creek area above Chiloquin has a good water source, Big Spring Creek, that could be easily diverted and utilized. In short, the valley land in this area offers one of the easiest projects in the district where new irrigated lands could be brought into production. The Indian owners (mostly) should be encouraged to undertake such a development.

7. Long-range plans should be drawn up to encourage and support efforts to:

a. Drain, reclaim and irrigate marsh lands around and north of Klamath Lake.

b. Drain, irrigate and utilize Klamath Marsh.

c. Protect from floods, reclaim and irrigate Sprague River Valley.

8. The drainage and alkalinity problems in Poe Valley should be watched very carefully and, should they appear to be increasing, immediate steps should be taken to lower the back water level in Lost River above the diversion dam near Olene, and improve the channel of Lost River through Poe Valley to provide a better drainage outlet for the Valley. Effects on land swamping of Harpold dam near Bonanza should also be carefully observed and remedial measures undertaken should this backwater impede drainage and cause alkalinity.

9. The range land in the southern part of the district is seriously depleted. Field trials and plot studies should be instituted to determine the efficacy of reseeding and improved management in bringing this range land into higher productivity.

10. Replanting and other reforestation and protection measures should be encouraged in the Ponderosa pine areas in the district and in the mountainous area along the Cascades to insure the future productivity of the commercial forests in the district.

11. The assistance of state, Federal and other research institutions should be enlisted in order to find uses and markets for the extensive stands of lodgepole pine in the district. As of now, this large area is of little or no economic value to the community.

12. Since the extent of potentially arable land in this district is so small, and there is a very large expanse of pumice and volcanic ash lands in the northern part of the district, it would appear highly desirable to institute a research program to determine whether or not this land could profitably be cleared, irrigated and farmed.

OWNERSHIP MAP

Due to the size and cost of the Ownership Map, it has been omitted from most of the volumes of this report. If the map is included, it will be found in the pocket on the back cover of the report.

This map is on file at:

Area Office, SCS, Bend, Oregon

Work Unit Office, SCS, Klamath Falls, Oregon

Directors of Poe Valley Soil Conservation District

If copies of this map are desired, they may be obtained by requesting from:

Soil Conservation Service
Cartographic Division
209 S. W. Fifth Avenue
Portland 4, Oregon